

REMARKS

I. Drawings

The drawings were objected to by the Examiner because Figure 3 is not included in the drawings as described in the specification. Applicant notes that the Examiner is correct. FIG. 2A, 2B and 2C correspond to the description of FIG. 3A, 3B and 3C in the specification. Applicant requests that the specification be amended to change FIG. 3 to FIG. 2 in the description. Specification amendments begin on page 2 of this document. Further, Applicant found two mistakes in FIG. 2A and 2C and submits amended replacement drawing sheets herewith. The changes are summarized below.

FIG. 2C: label number 202 was changed to label number 200; label number 318 was changed to 320.

FIG. 2B: label number 202 was changed to label number 200.

FIG. 2A: label number 202 was changed to label number 200.

II. Claim Objections

The claims have been amended according to Examiner's objections.

III. Claim Rejections – 35 USC §102

Examiner has rejected claims 43,-45, 63, 64, 67-69 and 73-74 under 35 U.S.C. 102(e) as being anticipated by Quesnel et al. (6,805,596). Applicant respectfully disagrees with the Examiner because the claims are patentably distinguishable from the prior art in accordance with MPEP 706.02(b). In particular, the cable described in Quesnel is materially different and accordingly comprises differing inherent physical properties. The inherent physical properties of the respective cables create a need for mechanical fittings designed specifically for one

application or another. Accordingly, the mechanical fittings cannot be the same in each application.

In column 5, line 2, Quesnel describes a current carrying cable that “includes a plurality of typically helically wound, outer strands and a central extending plurality of inner and helically wound and extending strands (such as also referred to as an inner composite core).” Moreover, in column 5, line 8, Quesnel describes the core as “the inner and extending layers or core is constructed of aluminum matrix composite wires.” In the art, aluminum matrix composites comprise strands of aluminum reinforced by Al_2O_3 , SiC, SiO_2 , B, BN, B_4C or AlN. The physical combination of these materials create a new material with unique properties when compared to the monolithic material properties.

In contrast, Applicant’s application discloses a composite core comprised of a plurality of fibers embedded in a resin matrix. As an example, in paragraph [0031], Applicant discloses one embodiment of an ACCC reinforced cable having a reinforced carbon fiber/epoxy resin composite inner core and a reinforced glass fiber/epoxy resin composite outer core. Accordingly, the composite core as disclosed in Applicant’s patent differs in material composition, physical characteristics of the materials that comprise the composite core and physical characteristics of the composite core itself. These physical characteristics may include predetermined ranges for the modulus of elasticity, tensile strength and thermal expansion coefficient.

In an aluminum conductor composite core reinforced cable as referred to in Applicant’s disclosure, the composite core is the load bearing member. Accordingly, crimping a tube to the aluminum conductor does not hold together the composite core load-bearing members of the two cables. Moreover, the exceptional crimping force used, around 60 tons psi, could crush the

composite core. Further still, the resin matrix of the composite core creates additional problems. The adhesives do not spread the forces applied to the bond across the entire area of the bond. Instead, the forces tend to localize along one or two inches of the bond. With the incredible tensional forces on the cables, the adhesive bonds tend to fail in successive one inch regions until the entire bond is compromised. Accordingly, the inherent physical properties of the core dictate the type of connector that is effective.

Notwithstanding the physical differences in the composite cores, the claims of Applicant's patent are distinguishable from the invention disclosed by Quesnel. Specifically, the Quesnel connector comprises, an aluminum sleeve to receive the aluminum matrix composite wires. The aluminum sleeve is further encapsulated by an outer steel tube. In the specification Quesnel states, "At this point, a mechanical compression operation is performed on the outer steel tube, interiorly held aluminum sleeve and inserted centrally extending plurality of wire strands. Although not shown, it is understood that a suitable compressor, such understood to include first and second opposing and mating dies for receiving therebetween the outer steel tube. The mechanical compressor may be rated to any suitable pressure application, such capable of exceeding 10,000 psi and it is also understood that the mechanical compression forming operation also provides the effect of reducing the overall area of the steel tube." Col. 5, line 18. Thus, in the Quesnel connection, excessive pressure is applied to the outer tube, deforming the outer tube and applying pressure within the core and aluminum sleeve.

In contrast, in Applicant's connector, a compression fitting includes a compressible body, a rigid enclosure and at least one compression implement. The compressible body comprises a cavity to receive the core and is further comprised of a malleable material such as malleable metals or an elastomer. The rigid enclosure encapsulates the compressible body and

functions to prevent the elastomer from becoming misshapen when the elastomer is compressed. Unlike the Quesnel disclosure, the rigid enclosure must maintain its shape when the elastomer is being compressed. Accordingly, the rigid enclosure is made of steel or other rigid material.

The rigid enclosure further may comprise a series of threads to receive a compression implement. The compression implement may be a nut that tightens and applies compressive force to the compressible body. The compressive force causes a compressive and frictional area of contact between the elastomer and the composite core. The frictional contact extends along the length of the composite core that is inside the elastomer.

In short, the Quesnel connector provides for a sleeve and tube that conform to the shape of the core by changing their shape. Moreover, the compression is accomplished by using opposing and mating dies that apply excessive pressure to the core and connector elements. Such pressure would crush a composite core comprised of a plurality of fibers embedded in a matrix. In contrast, Applicant's connector comprises an inner compressible body that conforms to the shape of the core, whereas, the outer rigid enclosure maintains its shape and functions to tighten around the compressible body causing an equal distribution of compressive forces to the core while preventing deformation of the compressible body. Applicant has amended claims 43 and 63 to further describe the composite core. Accordingly, because the inventions are not the same, do not function in the same fashion and in fact were developed to overcome different problems encountered when dealing with cores having completely different inherent physical properties, Applicant respectfully requests that Examiner withdraw the 102(e) rejection for claims 43-45, 63, 64, 67-69 and 73-74.

IV. Claim Rejections – 35 USC § 103

Examiner has rejected claims 1-8, 10-12, 16-19, 22, 24-35 and 37-39 under 35 USC 103(a) as being unpatentable over Moore (4,627,490). The rejection is respectfully traversed.

A. The Cited References Are Not Analogous

The Moore reference cited by the Examiner is not analogous to the art of the invention and as such, should not be considered in determining whether the invention is obvious. Each cited reference must be analogous to the art of the invention, if not, the reference is not regarded as within the scope and content of the prior art as required by 35 USC Section 103(a). A reference is considered analogous if it is either (1) “within the field of the inventor’s endeavor”, or (2) “reasonably pertinent to the particular problem with which the inventor was involved.” In re Deminski, 796 F.2d 436, 442 (Fed. Cir. 1986). “A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor’s endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor’s attention in considering his problem.” Wang Laboratories Inc. v. Toshiba Corp., 993 F.2d 858 (Fed. Cir. 1993).

The Moore reference cited by Examiner relates to an arrangement for enabling a multiple conductor power cable to be passed through a barrier, to be secured and sealed therewith against the well bore pressures and against pressure differentials in the well bore, and enables the multiple conductor terminations at each side of the barrier to be readily and easily connected with connectors of a suitable form. The purpose of the invention is to enable protection for power cables for the operation of well bore pumps and to further enable operation of the cables under tremendous electrical load conditions and under high pressure differentials.

The fields of art are not analogous. The field of Applicant’s invention relates to devices and methods to connect or splice high ampacity aluminum conductor composite core reinforced

cables for the transmission of electricity within power grids. The splice functions as both a mechanical junction that holds the two ends of the cables together and an electrical junction allowing the electric current to flow over or through the splice.

Applicant would not refer to the field of well bores, wellheads, or well bore barrier penetrations in order to seek a solution to the problem of splicing high ampacity electrical transmission cables. The Moore patent is aimed at overcoming difficulties in the art with pressure differentials and loss of insulation around the power cables descending into the well bores. Applicant's patent is aimed at splicing together high tension electrical power cables within a power grid system that may span hundreds of thousands of miles. Such splices must be sufficient to withstand incredible tensional forces (nearly 10,000 pounds). Because the problems faced in each area vastly differ, Applicant would not refer to the field of well bores, wellheads or well bore barrier penetrations to address the issue of splicing high tension cables.

Further, the Examiner cannot apply hindsight to enlarge the field of art to include the well bore industry. The field of well bores and oil fields is not reasonably pertinent to the problem that Applicant's invention addresses. Examiner does not provide suggestion as to why Applicant would turn to the field of well bores or the oil industry to solve the problem. Such hindsight analysis is not permissible under 35 USC 103(a).

Claims 1-8, 10-12, 16-19, 22, 24-35 and 37-39 are directed towards a compression fitting to connect a first aluminum conductor composite core reinforced cable to a second aluminum conductor composite core reinforced cable and towards a method to splice together a first aluminum conductor composite core reinforced cable to a second aluminum conductor composite core reinforced cable and an electrical splice for connecting a first aluminum conductor composite core reinforced cable to a second aluminum conductor composite core

reinforced cable. In accordance with the aforementioned argument, these claims would not have been obvious in view of Moore and as such, Applicant believes that claims 1-8, 10-12, 16-19, 22, 24-35 and 37-39 are in condition for allowance. Moreover, because independent claims 1, 16, and 28 are in condition for allowance, claims 9, 13-15, 20-21, 23 and 36 Applicant requests that Examiner also place these claims in condition for allowance.

B. No Suggestion or Motivation to Modify References

There is no suggestion or motivation to modify the reference cited by the Examiner. “To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.” MPEP §706.02(j).

As referenced above, the fields of art are completely different between Applicant’s invention and the Moore patent. The Examiner asserts that it would have been obvious to one skilled in the art to use the fitting of Moore to connect a first aluminum conductor composite core reinforced cable and a second aluminum composite core cable since the fitting of Moore comprises structure and material as claimed and since it has been held that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. First, the prior art structure is not capable of performing the intended use. The conductors as described in Moore are not for the high ampacity electrical power transmission in a power grid system. The conductors further comprise a core comprising a suitable conducting substance

of copper and the like (col. 3, line 64) whereas, the core in Applicant's invention comprises a plurality of fibers embedded in a resin matrix - none of the fibers including copper. Moore further discloses that "insulation between the core and the steel tube may be formed of any suitable elastomer or plastic or any combination thereof" (Col 3, line 65) whereas, the elastomer disclosed in Applicant's invention functions to compress the core while maintaining the shape of the external rigid enclosure. Moreover, the elastomer in the Moore patent further functions to provide a seal to prevent leakage of fluid pressure due to the pressure differential whereas the elastomer in Applicant's disclosure functions to create a frictional hold. Accordingly, notwithstanding that each element of the Moore invention is different, each element further comprises a different function. As such, there is no motivation to modify the Moore reference and Applicant respectfully requests that the Examiner reconsider and withdraw the 103(a) rejection.

According to the foregoing, the application is believed to be in condition for allowance and such action is requested.

C. Moore's Disclosed Configuration Does Not Resemble Applicant's

Moore discloses a penetrator assembly for a wellbore. Generally, the assembly is contained in a penetrator additionally comprising a housing for receiving the internal components of the penetrator. The penetrator further houses a support means to receive the insulated electric conductors through the housing. Each of the conductors are provided with outer, tightly fitting rigid tubes, preferably stainless steel tubes. The penetrator further comprises thrusting plates interspersed within the assembly that provide a space for receiving an engaging means. The engaging means clamps or grips each conductor to prevent longitudinal

movement relative to the housing. The insulation between the core and steel tube may comprise an elastomer. Three thrust plates and the elastomer seal all receive the electrical conductors.

In contrast, Applicant's invention comprises at least a compressible body, a rigid enclosure and at least one compression implement. The Examiner further draws attention to the use of elastomer in the Moore patent and Applicant's patent. The use of elastomer in each is different. Where the elastomer in Moore's invention maintain an effective seal to prevent leakage of fluid, the elastomer in Applicant's invention creates frictional contact extending along the length of the core to hold the core. Further, each element and the sequencing of each element of Applicant's invention is important to enable the creation of substantial but even compressive and frictional forces along the length of the core. Accordingly, notwithstanding minimal overlap of materials, i.e., elastomer, between Applicant's invention and the Moore patent, there is no overlap in elements used, sequencing of elements or in the function or end result of the use of the apparatus. As such, it would not have been obvious for Applicant to modify Moore's invention and Applicant requests withdrawal of the obviousness rejection.

V. Claim Rejections under 103(a)

Claims 70-72 have been rejected under USC 103 (a) as being unpatentable over Quesnel et al. Examiner states that Quesnel et al. discloses the invention substantially as claimed except for the void being filled with a substance to prevent moisture penetration into the void.

Applicant respectfully disagrees. Quesnel et al. does not disclose the invention substantially as claimed except for the void. As mentioned earlier, Quesnel's invention applies to a composite core comprised of aluminum matrix composites. Such composite cores are not susceptible to crushing under pressure such as Applicant's core. Accordingly, Quesnel et al. uses a two die system to exert pressure to the external area of the composite core and housings to deform the

housings. In contrast, Applicant uses a compression implement that screws into the rigid enclosure to tighten the enclosure around the elastomer surrounding the core thereby creating a void as the compression implement migrates further down the composite core. These voids can be problematic if they fill with water and corrode the core.

Because of these differences, no void is created in the Quesnel et al. patent. Accordingly, it would not have been obvious to one skilled in the art to fill the void of Quesnel et al. with a substance to prevent moisture penetrating the void. As such, Applicant requests that Examiner withdraw the rejection of claims 70-72 under 35 USC 103(a).

VI. Allowable Subject Matter

Applicant acknowledges and appreciates Examiner's allowance of Claims 47-62 and 75-90.

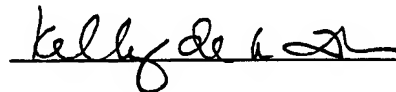
According to the foregoing, the application is believed to be in condition for allowance and such action is requested.

The Examiner is invited to telephone the undersigned if it is believed that such communication will further the prosecution of the application.

Respectfully submitted,

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